Geometry Ch 7-7 Exer, pg 479 #1-18

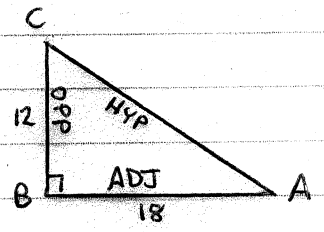
1. To SOLVE a right triangle means to find the measures of all its <u>angles</u> and <u>sides</u>.

2. To find the side length of a right triangle, when do you use a trig ratio and when do you use the Pythagorean Theorem?

Use trig ratio when you have one length and an angle.
Use Pythagorean Thm when you have two sides.

Use a calculator to approximate the measure of $\angle A$ to the nearest tenth of a degree.

3.



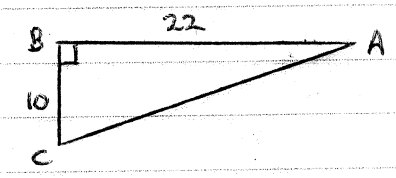
Which trig ratio involves OPP and ADJ?

$\tan A = \frac{OPP}{ADJ} = \frac{12}{18}$

$A = \tan^{-1}\left(\frac{12}{18}\right)$

$A = 33.7$

4.

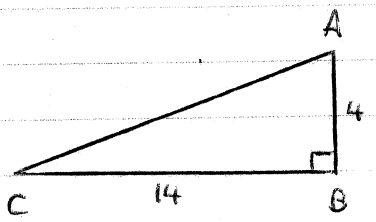


$\tan A = \frac{10}{22}$

$A = \tan^{-1}\left(\frac{10}{22}\right)$

$A = 24.4$

5.



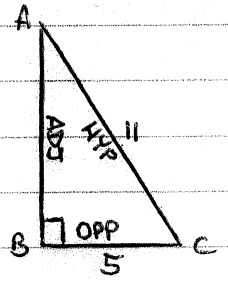
$\tan A = \frac{14}{4}$

$A = \tan^{-1}\left(\frac{14}{4}\right)$

$A = 74.1$

Use a calculator to approximate the measure of $\angle A$ to the nearest tenth of a degree.

6.



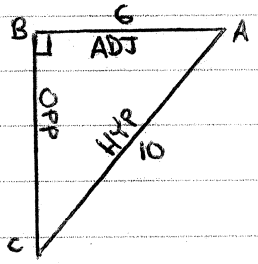
Which trig ratio uses OPP and HYP?

$\sin A = \frac{5}{11}$

$A = \sin^{-1}\left(\frac{5}{11}\right)$

$A = 27.0$

7



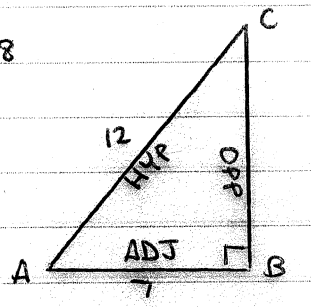
Which trig ratio uses ADJ and HYP?

$\cos A = \frac{ADJ}{HYP} = \frac{6}{10}$

$A = \cos^{-1}\left(\frac{6}{10}\right)$

$A = 53.1$

8



$\cos A = \frac{7}{12}$

$A = \cos^{-1}\left(\frac{7}{12}\right)$

$A = 54.3$

btw:

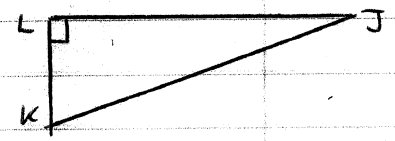
$\sin C = \frac{OPP}{HYP} = \frac{7}{12}$

$C = \sin^{-1}\left(\frac{7}{12}\right)$

$C = 35.7$

$\angle A + \angle C = 54.3 + 35.7 = \underline{\underline{90.0}}$

9. Which expression is correct?



A. $\sin^{-1}\frac{JL}{JK} = m\angle J$ $\quad \sin J = \frac{KL}{JK}$

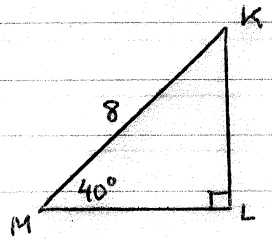
B. $\tan^{-1}\frac{KL}{JL} = m\angle J$ $\quad \tan J = \frac{KL}{JL}$

C. $\cos^{-1}\frac{JL}{JK} = m\angle K$ $\quad \cos K = \frac{KL}{JK}$

D. $\sin^{-1}\frac{JL}{KL} = m\angle K$ $\quad \sin K = \frac{JL}{JK}$

Solve the right triangle. Round decimals to nearest tenth.

10.



$\boxed{\angle M = 40^\circ}$

$\boxed{\angle L = 90^\circ}$

$\angle K = 180 - 40 - 90$

$\boxed{\angle K = 50^\circ}$

$\boxed{MK = 8}$

$\sin 40 = \frac{KL}{8}$

$8 \sin 40 = KL$

$\boxed{5.1 = KL}$

Possibilities for ML:

$\cos 40^\circ = \frac{ML}{8}$

$8 \cos 40^\circ = ML$

$\boxed{6.1 = ML}$

$(ML)^2 + (KL)^2 = (MK)^2$

$(ML)^2 = (8)^2 - (5.1)^2$

$(ML)^2 = 37.99$

$\boxed{ML = 6.2}$

Round-off error

$\tan K = \frac{ML}{5.1}$

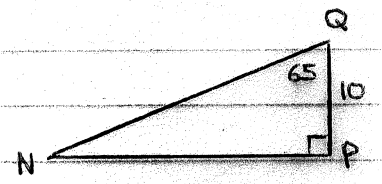
$5.1 \tan K = ML$

$5.1 \tan 50 = ML$

$\boxed{6.1 = ML}$

Do you see the other methods?

11.



$\boxed{\angle Q = 65^\circ}$

$\boxed{\angle P = 90^\circ}$

$\boxed{\angle N = 25^\circ}$

$\cos Q = \frac{10}{NQ}$

$NQ = \frac{10}{\cos 65}$

$\boxed{NQ = 23.7}$

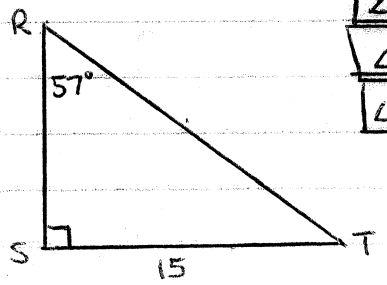
$\tan Q = \frac{NP}{10}$

$10 \tan 65 = NP$

$\boxed{21.4 = NP}$

$\boxed{PQ = 10}$

12.



$\boxed{\angle R = 57^\circ}$

$\boxed{\angle S = 90^\circ}$

$\boxed{\angle T = 33^\circ}$

$\sin 57 = \frac{15}{RT}$

$RT = \frac{15}{\sin 57}$

$\boxed{RT = 17.9}$

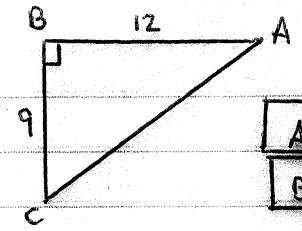
$\tan 57 = \frac{15}{RS}$

$RS = \frac{15}{\tan 57}$

$\boxed{RS = 9.7}$

$\boxed{ST = 15}$

13.



$\boxed{AB = 12}$

$\boxed{BC = 9}$

$AC^2 = AB^2 + BC^2$

$AC = \sqrt{144 + 81}$

$\boxed{AC = 15}$

$\tan \angle A = \frac{9}{12}$

$\angle A = \tan^{-1}\left(\frac{9}{12}\right)$

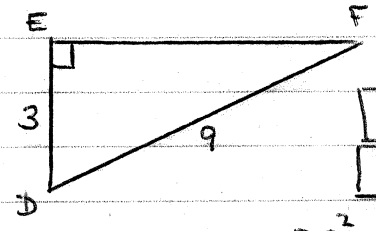
$\boxed{\angle A = 36.9^\circ}$

$\boxed{\angle B = 90.0^\circ}$

$\angle C = 180 - 90 - 36.9$

$\boxed{\angle C = 53.1^\circ}$

14.



$\boxed{DE = 3}$

$\boxed{DF = 9}$

$DE^2 + EF^2 = DF^2$

$EF^2 = 81 - 9$

$EF = \sqrt{72}$

$\boxed{EF = 8.5}$

$\cos \angle D = \frac{3}{9}$

$\angle D = \cos^{-1}\left(\frac{3}{9}\right)$

$\boxed{\angle D = 70.5^\circ}$

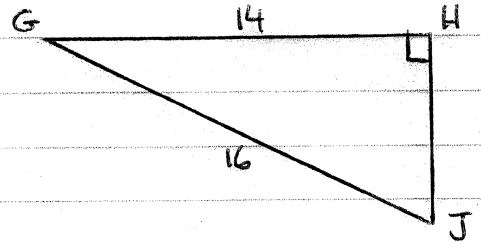
$\sin \angle F = \frac{3}{9}$

$\angle F = \sin^{-1}\left(\frac{3}{9}\right)$

$\boxed{\angle F = 19.5^\circ}$

$\boxed{\angle E = 90.0^\circ}$

15.



$\boxed{GH = 14}$

$\boxed{GJ = 16}$

$GH^2 + HJ^2 = GJ^2$

$HJ^2 = 256 - 196$

$HJ = \sqrt{60}$

$\boxed{HJ = 7.7}$

$\sin J = \frac{14}{16}$

$\angle J = \sin^{-1}\left(\frac{14}{16}\right)$

$\boxed{\angle J = 61.0^\circ}$

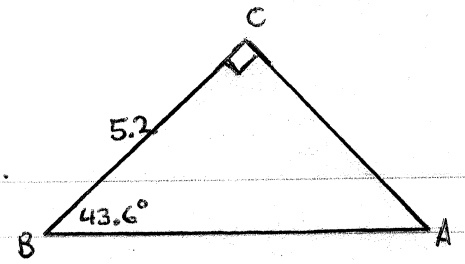
$\tan G = \frac{7.7}{14}$

$\angle G = \tan^{-1}\left(\frac{7.7}{14}\right)$

$\boxed{\angle G = 28.8^\circ}$ [*Round-off from HJ = 7.7]

$\boxed{\angle H = 90.0^\circ}$

16.



$\tan 43.6 = \frac{AC}{5.2}$

$5.2 \tan 43.6 = AC$

$\boxed{5.0 = AC}$

$\cos 43.6 = \frac{5.2}{AB}$

$AB = \frac{5.2}{\cos 43.6}$

$\boxed{AB = 7.2}$

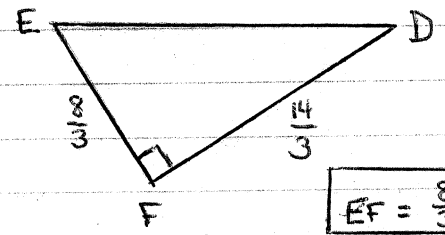
$\boxed{\angle C = 90.0°}$

$\boxed{\angle B = 43.6°}$

$\boxed{\angle A = 46.4°}$

$\boxed{BC = 5.2}$

17.



$\boxed{EF = \frac{8}{3}}$

$\boxed{DF = \frac{14}{3}}$

$DE^2 = EF^2 + DF^2$

$DE = \sqrt{\left(\frac{8}{3}\right)^2 + \left(\frac{14}{3}\right)^2}$

$DE = \sqrt{\frac{64}{9} + \frac{196}{9}} = \sqrt{\frac{260}{9}}$

$\boxed{DE = 5.4}$

$\tan E = \frac{\left(\frac{14}{3}\right)}{\left(\frac{8}{3}\right)} = \frac{14}{8}$

$\angle E = \tan^{-1}\left(\frac{14}{8}\right)$

$\boxed{\angle E = 60.3°}$

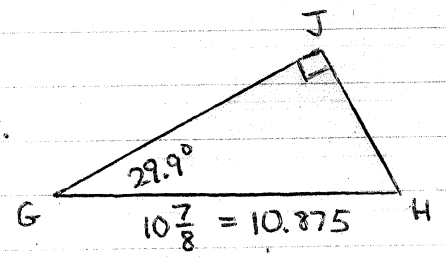
$\tan D = \frac{\left(\frac{8}{3}\right)}{\left(\frac{14}{3}\right)} = \frac{8}{14}$

$\angle D = \tan^{-1}\left(\frac{8}{14}\right)$

$\boxed{\angle D = 29.7°}$

$\boxed{\angle F = 90.0°}$

18.



$\sin G = \frac{JH}{10.875}$

$10.875 \sin 29.9 = JH$

$\boxed{5.4 = JH}$

$\cos G = \frac{GJ}{10.875}$

$10.875 \cos 29.9 = GJ$

$\boxed{9.4 = GJ}$

$\boxed{\angle G = 29.9°}$

$\boxed{\angle H = 60.1°}$

$\boxed{\angle J = 90.0°}$

$\boxed{GH = 10.875}$